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CONSUMPTION OF NATURAL GAS AND

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-- PRELIMINARY --

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CONSUMPTION OF NATURAL GAS AND
ELECTRICITY IN MONTANA

-- PRELIMINARY --

WHEELING, AC

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MONTANA ENERGY ADVISORY COUNCIL
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Consumption of Natural Gas and Electricity in Montana

This report was prepared to assemble detailed information and estimates concerning the consumption of natural gas and electricity in Montana for the Montana Energy Advisory Council staff and members of the Citizens Advisory Committee on Energy. Further collection of data and analysis of end use of energy are currently underway which may update, revise or replace the data presented here.

Residential Sector

Total consumption of natural gas and electricity by the residential sector in Montana are presented for selected years in Table 1.

Table 1
Montana Residential Consumption of
Natural Gas and Electricity

<u>Year</u>	<u>Natural Gas 1/ (10⁹ cubic feet)</u>	<u>Percent Increase</u>	<u>Electricity 2/ (million kwhr)</u>	<u>Percent Increase</u>
1950	12.3		378	
		4.2%/yr		9.5%/yr
1960	18.5		935	
		2.4%/yr		5.0%/yr
1970	23.5		1,521	
		3.8%		6.1%
1971	24.4		1,614	
		6.1%		5.9%
1972	25.9		1,710	
		-4.6%		8.3%
1973	24.7		1,852	
		-3.6%		1.3%
1974	23.8		1,877	

1/ American Gas Association, Gas Facts, various years.

2/ Edison Electric Institute, Statistical Yearbook of the Electric Utility Industry, various years.

In order to more fully understand how energy is used within the residential sector, estimates of energy use for various appliances and of appliance saturation in Montana were obtained for selected years. Appliance saturation data were taken from the U. S. Census of Housing for 1950, 1960, and 1970, as well as from surveys made by the Montana Power Company of its customers in 1965, 1968, 1971, and 1974 (see the Appendix for detailed results of these surveys). Estimates of the national average annual energy usage of various appliances were available for 1969 for electrical appliances and for 1971 for natural gas appliances (see Table 4). These data were used with the 1970 U. S. Census and the January 1971, Montana Power Company appliance saturation data to derive the 1970 end use estimates as shown in Tables 2 and 3.

Table 2
Estimates of Residential End Use of
Natural Gas in Montana -- 1970 ^{1/}
Total Number of Housing Units = 217,300

<u>Appliance</u>	<u>National Average Annual Use (MCF) ^{2/}</u>	<u>Percent ^{3/} Saturation</u>	<u>Calculated Montana Consumption (billion cf)</u>	<u>Percent of Total</u>
Gas Space Heater	119	69.5%	17.97	78.1%
Gas Water Heater	32	61.9%	4.30	18.7%
Gas Range	10	25.1%	.55	2.4%
Gas Clothes Dryer	7	3.4%	.05	0.2%
Gas Air Conditioner	28	0.3%	.02	0.1%
Gas Light	18	2.8%	<u>.11</u>	<u>0.5%</u>
Total			23.00	100.0%

Total Montana Residential Gas Consumption in 1970 = 23.50 billion cf.

^{1/} 1970 U. S. Census of Housing.

^{2/} See Table 4.

^{3/} Data for space heating, water heating, cooking, and clothes drying are from the 1970 U. S. Census of Housing, other end uses are from the Montana Power Company January 1971 survey (see Appendix).

Table 3
Estimates of Residential End Use of
Electricity in Montana -- 1970 ^{1/}
Total Number of Housing Units = 217,300

<u>Appliance</u>	<u>National Average Annual ^{2/} Use (Kwhr)</u>	<u>Percent ^{3/} Saturation</u>	<u>Calculated Montana Consumption (10⁶ Kwhr)</u>	<u>Percent of Total</u>
Electric Furnace	37,000	3.9%	313.6	23.3%
Water Heater	4,219	29.6%	271.4	20.2%
Electric Range	1,175	65.7%	167.8	12.5%
Refrigerator	728	99.7%	157.7	11.7%
Food Freezer	1,195	54.1%	140.5	10.5%
Clothes Dryer	993	51.9%	112.0	8.3%
Clothes Washer	103	84.8%	19.0	1.4%
Dishwasher	363	29.7%	23.4	1.7%
Air Conditioner				
Room	1,389	6.7%	20.2	1.5%
Central	4,100	1.7%	15.5	1.2%
Television				
Black & White	362	46.5%	36.6	2.7%
Color	502	60.1%	<u>65.6</u>	<u>4.9%</u>
Total			1,343.3	100.0%

Total Montana Residential Electricity Use in 1970 = 1,521.0 million kwhr.

^{1/} 1970 U. S. Census of Housing.

^{2/} Data for electric furnace developed by Carrier Corporation for typical conditions in Minneapolis, Minnesota, all others taken from Table 4.

^{3/} Data for space heating, water heating, cooking, and clothes drying are from the 1970 U. S. Census of Housing, other end uses are from the Montana Power Company, January 1971, survey (see Appendix).

It is interesting to note that the national average appliance energy usage data provide a remarkably good fit to the total residential use for both natural gas and electricity. The calculations developed in Table 2 "account" for 23.0 of the 23.5 billion cubic feet (98%) of natural gas used; those in Table 3, which do not include electric lighting, "account" for 1,343 of the 1,521 million kilowatt-hours (88%) of electricity used. Together these data "account" for about 96% of residential use of these two energy sources (computed on a BTU basis). This is not intended to imply, however, that the calculated levels of energy end use accurately portray the energy actually used; much more Montana specific research needs to be done to determine these end use quantities.

The above estimates are combined on a BTU basis and compared to two national residential energy end use estimates in Table 5. The data are not directly comparable, since they are for different years, different fuels, and different appliance coverage. It should be noted that the Montana estimates include only natural gas and electricity, and also exclude electric lighting. Nevertheless, a trend is evident, which should reasonably be expected due to Montana's relatively cold climate, of greater use of energy for space heating and less for air conditioning in Montana compared to the nation.

Table 4
Electricity and Natural Gas Consumption
in the Residential Sector by End Use

<u>Electrical Appliances</u> ^{*/}		<u>Natural Gas Appliances</u> ^{**/}	
<u>Type</u>	<u>Average Annual Usage (Kwh)</u>	<u>Type</u>	<u>Average Annual Usage (Mcf)</u>
Air Conditioner		Air Conditioner --	
Room	1,389	consumption per ton	28
Central	4,100	Clothes Dryer	
Clothes Dryer	993	Electric pilot	6
Dishwasher	363	Gas pilot	8
Electric Blanket	147	Gas Grill	3
Fan -- Attic	291	Gas Heat (all types)	112
Food Freezer (15 cu. ft.)	1,195	Gas Light	18
Heat Pump	16,003	Incinerator	13
Oil Burner or Stoker	410	Range	
Range	1,175	House	11
Refrigerator (12 cu. ft.)	728	Apartment	9
Refrigerator (Frostless		Water Heater	32
12 cu. ft.)	1,217		
Television (Black & White)	362		
Television (Color)	502		
Washing Machine --			
automatic	103		
Water Heater --			
standard	4,219		
Water Pumps	231		

*/ Under normal use for the year 1969.

**/ Average usage excluding extremes, for the year 1971. These data were compiled from 157 companies representing 23.5 million customers in the U. S. or 60 percent of the total.

Sources: The Federal Power Commission, The 1970 National Power Survey, Part 1, December 1971, P.I-3-9; and the American Gas Association, Department of Statistics, "Single-Family Residential Gas Appliance Usage, 1971," February 1973.

Table 5
Estimates of Residential End Use of Energy
(Percent of Total Use)

<u>End Use</u>	<u>National Estimates (All Fuels)</u>		<u>Montana Estimate (Electricity and Natural Gas Only)</u>
	<u>1968</u> ^{1/}	<u>1974</u> ^{2/}	<u>1970</u> ^{3/}
Space Heating	57.3%	54.1%	69.0%
Water Heating	15.1%	15.5%	19.0%
Refrigeration	5.7%	6.8%	3.7%
Cooking	5.7%	4.7%	4.1%
Air Conditioning	3.6%	6.1%	0.5%
Clothes Drying	1.6%	2.0%	1.6%
Lighting and Other	10.9%	10.8%	2.2%

1/ Stanford Research Institute, Patterns of Energy Consumption in the United States, 1972.

2/ Preliminary estimate by the Federal Energy Administration.

3/ Estimate developed from Tables 2 and 3, using 1000 BTU/cubic foot and 3,412 BTU/kwhr. Note that (1) electric lighting is not included and (2) these calculations account for about 96% of the 1970 total Montana residential use of natural gas and electricity as reported by the American Gas Association and the Edison Electric Institute, respectively.

Commercial Sector

Total consumption of natural gas and electricity by the commercial sector in Montana are presented for selected years in Table 6.

Table 6
Montana Commercial Consumption of
Natural Gas and Electricity

<u>Year</u>	<u>Natural Gas ^{1/}</u> <u>(10⁹ cubic feet)</u>	<u>Percent</u> <u>Increase</u>	<u>Electricity ^{2/}</u> <u>(million kwhr)</u>	<u>Percent</u> <u>Increase</u>
1950	5.9		219	
		6.4%/yr		9.2%/yr
1960	11.0		529	
		3.4%/yr		8.4%/yr
1970	15.4		1,188	
		3.2%		5.6%
1971	15.9		1,254	
		6.3%		5.7%
1972	16.9		1,325	
		-3.6%		9.2%
1973	16.3		1,447	
		-3.7%		2.8%
1974	15.7		1,488	

1/ American Gas Association, Gas Facts, various years.

2/ Edison Electric Institute, Statistical Yearbook of the Electric Utility Industry, various years.

Montana specific energy end use data are not currently available for the commercial sector. National estimates of the percentage breakdown of energy use by function are presented in Table 7.

Table 7
Estimates of Commercial End Use of Energy
in the United States
(All Fuels)

<u>End Use</u>	<u>1968</u> ^{1/}	<u>1974</u> ^{2/}
Space Heating	47.7%	43.9%
Air Conditioning	12.7%	14.9%
Feed Stock	11.2%	10.5%
Refrigeration	7.6%	7.0%
Water Heating	7.4%	6.1%
Cooking	1.6%	1.8%
Lighting and Other	11.7%	15.8%

1/ Stanford Research Institute, Patterns of Energy Consumption in the United States, 1972.

2/ Preliminary estimate by the Federal Energy Administration.

In order to have an order-of-magnitude estimate of annual natural gas consumption by individual establishments within the commercial sector in Montana, a few examples (comprising about 20% of total commercial use) were collected from available sources and are presented in Table 8.

Table 8
Examples of Annual Natural Gas Consumption
by the Commercial Sector in Montana

<u>Firm</u>	<u>Location</u>	<u>Source</u>	<u>Year</u>	<u>Natural Gas Use (1000 MCF)</u>
State Government				
Montana Tech	Butte	1	6/74-6/75	49.5
State Prison	Deer Lodge	1	6/74-6/75	124.3
Boulder River School	Boulder	1	6/74-6/75	141.5
Montana State University	Bozeman	1	6/74-6/75	480.0
Northern Montana College	Havre	1	6/74-6/75	62.3
Capitol Complex	Helena	1	6/74-6/75	62.5
Warm Springs Hospital	Warm Springs	1	6/74-6/75	212.0
Galen State Hospital	Galen	1	6/74-6/75	85.0
University of Montana	Missoula	1	6/74-6/75	223.0
Western Montana College	Dillon	1	6/74-6/75	73.0
Eastern Montana College	Billings	1	6/74-6/75	96.3
Subtotal				1,709.3

Table 8 Cont'd.

<u>Firm</u>	<u>Location</u>	<u>Source</u>	<u>Year</u>	<u>Natural Gas Use (1000 MCF)</u>
Buttrey Foods	Great Falls	2	1974	11.0
Great Falls College	Great Falls	2	1974	33.0
Deaconess Hospital	Great Falls	2	1974	40.0
Sewage Plant	Great Falls	2	1974	50.0
Malmstrom Air Force Base	Great Falls	2	1974	845.0 ^{*/}
Glasgow Air Force Base	Glasgow	3	4/75-4/76	101.0
Rocky Mountain College	Billings	2	1974	46.0
Deaconess Hospital	Billings	2	1974	52.0
St. Vincents Hospital	Billings	2	1974	<u>37.0</u>
Total				2,924.3

^{*/} Approximately 40% of the volume shown was used by residents of the base and 60% was used for base facilities.

- Sources:
1. Montana Energy Advisory Council, Memorandum dated August 27, 1975.
 2. Henningson, Durham, and Richardson, Energy and Secondary Materials Market Report, prepared for the Solid Waste Management Bureau, Montana Department of Health and Environmental Sciences, May 1976.
 3. Montana-Dakota Utilities, "Report of Gas Supply and Requirements", prepared for the Federal Power Commission, 1976.

Industrial Sector

Total consumption of natural gas and electricity by the industrial sector in Montana for selected years are presented in Table 9. Consumption during 1974 by mining and manufacturing is presented in Table 10 by Standard Industrial Classification (SIC). Discrepancies between the data presented in these two tables are most probably due to differences in classification of the industrial sector by the various reporting agencies.

Table 9
Montana Industrial Consumption
of Natural Gas and Electricity

<u>Year</u>	<u>Natural Gas</u> <u>(billion cubic feet)</u>	<u>1/</u> <u>Percent</u> <u>Increase</u>	<u>Electricity</u> <u>(million kwhr)</u>	<u>2/</u> <u>Percent</u> <u>Increase</u>
1950	12.9		1,559	
1960	19.8	4.4%/yr	2,973	6.7%/yr
1970	36.4	6.3%/yr	6,120	7.5%/yr
1971	35.6	-2.2%	6,079	-0.7%
1972	36.7	3.1%	5,888	-3.1%
1973	36.5	-0.5%	5,031	-14.6%
1974	36.1	-1.1%	5,963	18.5%

1/ American Gas Association, Gas Facts, various years.

2/ Edison Electric Institute, Statistical Yearbook of the Electric Utility Industry, various years.

Table 10
Consumption of Natural Gas and Electricity
by Mining and Manufacturing in Montana -- 1974

SIC	Industry	1/ Natural Gas (mmcf)	Percent of Total	2/ Electricity (1000 kwhr)	Percent of Total	4/ Percent of Combined Energy
<u>Mining</u>						
10	Metal Mining	NA		377,370	6.5%	
12	Bituminous Coal and Lignite	NA		8,336	0.1%	
13	Crude Petroleum, Natural Gas	NA		205,415	3.5%	
14	Nonmetallic Mineral Mining	NA		45,790	0.8%	
	Subtotal Mining	3,367	9.0%	636,911	11.0%	9.7%
<u>Manufacturing</u>						
20	Food and Kindred Products	1,270	3.4%	69,577	1.2%	2.6%
24	Lumber and Wood Products	900	2.4%	235,176	4.0%	3.0%
25	Furniture and Fixtures	363	1.0%	3/		0.6%
26	Paper and Allied Products	4,700	12.5%	151,047	2.6%	9.1%
27	Printing and Publishing	508	1.4%	6,414	0.1%	0.9%
28	Chemicals and Allied Products	1,100	2.9%	489,802	8.4%	4.8%
29	Petroleum and Coal Products	6,195	16.5%	311,767	5.4%	12.7%
32	Stone, Clay, Glass & Concrete	4,400	11.7%	81,704	1.4%	8.2%
33	Primary Metals	13,100	34.9%	3,829,054	65.9%	45.6%
34	Fabricated Metals	436	1.2%	580	0.01%	0.8%
35	Machinery (Non-electrical)	0	0.0%	1,342	0.02%	0.0%
36	Electrical Machinery	327	0.9%	0	0.0%	0.6%
37	Transportation Equipment	300	0.8%	402	0.01%	0.5%
39	Other Manufacturing	546	1.5%	0	0.0%	1.0%
	Subtotal Manufacturing	34,145	91.0%	5,176,865	89.0%	90.3%
	Total Mining and Manufacturing	37,512	100.0%	5,813,777	100.0%	100.0%

NA = not available.

1/ Gas Requirements Committee, Future Gas Consumption of the United States, Volume 6, December 1975.

2/ Federal Reserve Bank of Minneapolis.

3/ Included with fabricated metals (34).

4/ Assumes 1000 BTU/cubic foot and 3,412 BTU/kwhr.

Data outlining the use of natural gas by some of the largest industrial consumers, along with brief comments on end use, are presented in Table 11. Further data for the Montana-Dakota Utilities system are shown in Table 12. Definitions of priority categories used in Table 12 are given below.

PRIORITY DEFINITIONS

Priority 1 -- Residential, small commercial (less than 50 mcf on a peak day).

Priority 2 -- Large commercial requirements (50 mcf or more on a peak day), firm industrial requirements for plant protection, feedstock and process needs, storage injection requirements, and small industrial requirements (50 mcf or less on a peak day).

Priority 3a -- All industrial requirements not specified in paragraphs 2, 4, 5, 6, 7, 8, or 9 for industrial customers whose total annual requirements are less than 36,720 mcf.

Priority 3b -- All industrial requirements not specified in paragraphs 2, 4, 5, 6, 7, 8, or 9 for industrial customers whose total annual requirements are greater than 36,720 mcf.

Priority 4 -- Firm industrial requirements for boiler fuel use at less than 3,000 mcf per day, but more than 1,500 mcf per day, where alternate fuel capabilities can meet such requirements.

Priority 5 -- Firm industrial requirements for large volume (3,000 mcf or more per day) boiler fuel use where alternate fuel capabilities can meet such requirements.

Priority 6 -- Interruptible requirements of more than 300 mcf per day, but less than 1,500 mcf per day, where alternate fuel capabilities can meet such requirements.

Priority 7 -- Interruptible requirements of intermediate volumes (from 1,500 mcf per day through 3,000 mcf per day), where alternate fuel capabilities can meet such requirements.

Priority 8 -- Interruptible requirements of more than 3,000 mcf per day, but less than 10,000 mcf per day, where alternate fuel capabilities can meet such requirements.

Priority 9 -- Interruptible requirements of more than 10,000 mcf per day, where alternate fuel capabilities can meet such requirements.

Table 11
Consumption of Natural Gas by
Selected Montana Industries

Company	Year	Natural Gas Use (bcf)	Comments
<u>Montana Power Company System</u>			
Anaconda Company			
Anaconda	1975	9.519	New electric furnace will replace existing four natural gas furnaces and will save up to 4 bcf/yr.
Great Falls	1975	1.278	Used to produce about 27 million lbs. of steam per month from five boilers for process and heating/cooling.
Butte	1975	.763	About 21% used to produce process steam.
Columbia Falls	1974	.476	
Ideal Cement	1975	1.9	Have converted to Wyoming coal -- about 325 tons per day.
Kaiser Cement	1974	1.0	Considering converting to coal -- estimated to require about 80,000-90,000 tons per year of 10,000 BTU/lb coal.
Stauffer Chemical	1974	.76	87% used for process steam and 13% used for heating/cooling.
Hoerner-Waldorf	1974	4.6	Steam generated from seven boilers (six are fired by natural gas/oil/spent liquor, one by natural gas/hog fuel) -- about 1/3 of steam produced is used to generate electricity.
C & C Plywood	FY 74-75	.18	Frank Bird and J. E. Corette plants.
Phillips Petroleum	1974	.30	
Electric Generation	1975	.455	
Subtotal		21.231	Represents about 86% of combined Montana Power and Great Falls Gas 1975 industrial gas sales.
<u>Montana-Dakota Utilities System</u>			
Farmer's Union Refinery	1975	1.979	Steam generated (including other fuels) for 50% process use, 50% heating/cooling.
Continental Oil Refinery	1975	1.813	Steam generated (including other fuels) for 37% process use, 63% heating/cooling.
Exxon Oil Refinery	1975	.260	Steam generated (including other fuels) for 25% process use, 60% heating/cooling and 15% for power turbines.
Great West Sugar	1975	1.793	Converting to coal (three out of four furnaces), and will save about .9 bcf per year.
Holly Sugar	1975	1.428	Operate only about 22 weeks per year, in fall and winter.
Electric Generation	1975	.631	Represents about 89% of Montana-Dakota Utilities 1975 industrial sales in Montana.
Subtotal		7.904	
Total		29.135	

* / Includes Great Falls Gas Company industrial sales.

Sources: (1) Henningson, Durham and Richardson, Energy and Secondary Materials Market Report, May 1976.

(2) Montana-Dakota Utilities, Curtailment Plan filed with Federal Power Commission, 1976.

Table 12

Montana-Dakota Utilities Co.
End Use of Natural Gas

MONTANA - CALENDAR 1975

Customer	Location	SIC Code Major Group	Federal Power Commission Priority Numbers									
			1	2	3A	3B	4	5	6	7	8	Total
Annual Use by Priority Customers Using Over 36,720 Mcf Per Year												
Central Oil	Billings	29	-	7,376	-	1,016,489	-	788,675	-	-	-	1,812,540
Laurel	Billings	29	-	158,468	-	101,652	-	-	-	-	-	260,100
Farmer's Union Central Exchange	Laurel	29	-	-	-	1,050,703	-	928,097	-	-	-	1,978,800
Gary Operating	Bell Creek	13	-	-	-	135,565	-	-	-	-	-	135,565
Great Western Sugar	Billings	20	-	9,522	-	395,264	-	1,388,456	-	-	-	1,793,227
Rocky Sugar	Sidney	20	-	3,106	-	510,774	-	911,920	-	-	-	1,428,000
Levitt Clay	Billings	32	-	455	-	58,705	-	-	-	-	-	59,160
Pillar Lumber	Billings	20	-	78,540	-	122,400	-	-	-	-	-	200,940
Shell Oil (Little Beaver)	Laurel	13	-	88	-	96,019	-	-	-	-	-	96,900
Shell Oil (Pine Unit)	Baker	13	-	2,514	-	435,086	-	-	-	-	-	438,600
Tyler Petroleum	Wolf Point	29	-	388	-	47,654	-	-	-	-	-	48,042
Midland Empire Packing	Billings	20	-	790	-	61,713	-	-	-	-	-	62,503
Shell Oil Meter No. 117987	Baker	13	-	-	-	168,699	-	-	-	-	-	168,699
All other Customers												
Alcoa Lumber Service	Billings	72	-	9,848	-	-	-	-	-	-	-	9,848
Atlantic Richfield	Belfry	13	-	47	-	7,543	-	-	-	-	-	7,590
Ball	Billings	17	-	4,522	-	-	-	-	-	-	-	4,522
Box Six Lumber Supply	Billings	27	-	-	-	10,376	-	-	-	-	-	10,376
Billings Lumber	Billings	27	-	-	-	7,723	-	-	-	-	-	7,723
Billings Lumber	Billings	27	-	-	-	18,935	-	-	-	-	-	19,247
Billings Lumber	Billings	27	-	312	-	5,525	-	-	-	-	-	5,525
Central Feed Mill	Hardin	20	-	-	-	7,274	-	-	-	-	-	7,274
Deluxe Paper Printers	Billings	27	-	-	-	2,274	-	-	-	-	-	2,274
Edwards Bakery	Billings	20	-	627	-	15,556	-	-	-	-	-	16,183
Elk River Concrete Products	Billings	32	-	186	-	11,533	-	-	-	-	-	11,719
Empire Steel Manufacturing	Billings	33	-	2,463	-	6,110	-	-	-	-	-	8,573
Farmer's Union	Glendive	07	-	5,201	-	-	-	-	-	-	-	5,201
Farr Paper Feeds	Billings	20	-	153	-	8,966	-	-	-	-	-	9,119
G.A. Surfercenter	Saco	67	-	21,021	-	-	-	-	-	-	-	21,021
Hospital Laundry Services	Billings	72	-	9,109	-	-	-	-	-	-	-	9,109
Institute Laundry	Billings	72	-	256	-	15,498	-	-	-	-	-	15,754
Midland Lumber	Billings	27	-	284	-	5,043	-	-	-	-	-	5,327
Midland Lumber	Billings	27	-	334	-	8,875	-	-	-	-	-	9,229
Midland Lumber	Billings	27	-	1,199	-	15,802	-	-	-	-	-	17,001
Midland Lumber	Billings	27	-	351	-	4,800	-	-	-	-	-	5,151
Midland Lumber	Billings	27	-	8,811	-	-	-	-	-	-	-	8,811
Midland Lumber	Billings	27	-	418	-	13,518	-	-	-	-	-	13,916
Midland Lumber	Billings	27	-	6,957	-	-	-	-	-	-	-	6,957
Midland Lumber	Laurel	40	-	28,681	-	-	-	-	-	-	-	28,681
Midland Lumber	Laurel	40	-	5,028	-	-	-	-	-	-	-	5,028
Midland Lumber	Billings	07	-	4,849	-	-	-	-	-	-	-	4,849
Midland Lumber	Billings	07	-	12,624	-	-	-	-	-	-	-	12,624
Midland Lumber	Billings	72	-	465	-	24,373	-	-	-	-	-	24,838
Midland Lumber	Saco	20	-	373	-	5,887	-	-	-	-	-	6,260
Midland Lumber	Laurel	37	-	4,842	-	18,384	-	-	-	-	-	23,226
Midland Lumber	Billings	20	-	3,421	-	5,151	-	-	-	-	-	8,572
Total Montana			-	225,453	-	4,201,703	-	4,010,448	-	-	-	8,832,387

From Stone & Webster Management Consultants, Montana-Dakota Utilities Co., End Use of Natural Gas,
prepared for Montana-Dakota Utilities, March 1976.

APPENDIX

Appliance Saturation Estimates

Estimates of Appliance Saturation in Montana

Use - Fuel Type	U.S. Census Bureau(1)			Montana Power Company(2)	
	Urban	Rural	Total	Range within Divisions	System Total
Total Units	121,200	96,100	217,300	4,949-37,384	149,705
Cooking (Range)					
Electricity	64.9%	66.7%	65.7%	65.7%-84.8%	74.5%
Natural Gas	32.5	15.7	25.1	7.3 -32.3	22.5
Bottled Gas	1.4	13.2	6.6	0.7 - 6.6	2.2
Other	0.5	3.9	2.0	0.1 - 1.9	0.6
None	0.7	0.5	0.6	0.0 - 0.8	0.2
Home Heating					
Electricity	1.4	7.1	3.9	0.6 - 4.0	1.7
Natural Gas	93.9	38.8	69.5	60.9 -92.4	83.8
Bottled Gas	1.2	17.7	8.5	1.3 -12.3	4.6
Other	3.5	36.4	18.1	5.7 -29.8	9.9
None	0.0	0.0	0.0	0.0	0.0
Water Heating					
Electricity	11.4	52.7	29.6	8.4 -51.0	18.6
Natural Gas	86.9	30.4	61.9	43.7 -89.7	77.7
Bottled Gas	0.9	10.1	5.0	0.3 - 6.2	2.4
Other	0.1	1.3	0.7	0.2 - 1.4	0.6
None	0.7	5.5	2.8	0.0 - 3.0	0.7
Clothes Drying					
Electricity	49.6	54.7	51.9	55.0 -65.7	60.8
Gas	3.8	2.8	3.4	1.3 - 7.5	4.0
None	46.6	42.5	44.8	31.4 -42.9	35.2

(1) from 1970 U.S. Census of Housing, as reported in AGA Gas Facts, 1971.

(2) survey taken in January,1971 of Montana Power Company customers.

Fuels Used for Residential Heating in Montana, 1950-1970

Fuel Type	1950	1960	1970
Home Heating - Total			
Housing Units	172,000	202,200	217,300
Natural Gas	43.1%	61.1%	69.5%
Electricity	-	1.3	3.9
Bottled Gas	1.6	5.2	8.5
Liquid Fuel	21.0	19.0	13.8
Coal/Coke	20.5	6.9	2.1
Wood	11.2	5.8	1.9
Other	2.4	0.6	0.3
None	0.1	0.1	0.0
Home Heating - Urban			
Housing Units	79,700	107,500	121,200
Natural Gas	72.4%	88.1%	93.9%
Electricity	-	0.7	1.4
Bottled Gas	0.6	0.9	1.2
Liquid Fuel	9.8	6.4	2.6
Coal/Coke	11.7	2.3	0.5
Wood	3.3	1.0	0.2
Other	2.1	0.6	0.2
None	0.1	0.0	0.0
Home Heating - Rural			
Housing Units	92,300	94,700	96,100
Natural Gas	17.8%	30.4%	38.8%
Electricity	-	2.1	7.1
Bottled Gas	2.5	10.0	17.7
Liquid Fuel	30.8	33.4	28.0
Coal/Coke	28.1	12.1	4.1
Wood	18.1	11.2	4.1
Other	2.7	0.6	0.4
None	0.1	0.1	0.0

Source: U.S. Census of Housing, as reported in American Gas Association's
Gas Facts.

Fuels Used for Residential Heating in the United States, 1950-1970

Fuel Type	1950	1960	1970
Home Heating - Total			
Housing Units	41,829,300	53,024,100	63,447,100
Utility Gas	26.6%	43.1%	55.2%
Electricity	-	1.8	7.7
Bottled Gas	2.3	5.1	6.0
Liquid Fuel	22.6	32.3	26.0
Coal/Coke	34.6	12.2	2.9
Wood	10.0	4.2	1.3
Other	2.5	0.4	0.4
None	1.4	0.9	0.6
Home Heating - Urban			
Housing Units	27,860,900	38,320,500	47,649,800
Utility Gas	35.2%	53.3%	64.9%
Electricity	-	1.5	7.1
Bottled Gas	0.1	2.1	1.9
Liquid Fuel	22.8	31.2	22.8
Coal/Coke	35.2	9.7	1.9
Wood	2.2	0.7	0.2
Other	2.2	0.4	0.5
None	1.5	1.0	0.7
Home Heating - Rural			
Housing Units	13,968,400	14,703,600	15,797,300
Utility Gas	9.5%	16.6%	26.0%
Electricity	-	2.4	9.3
Bottled Gas	5.3	12.7	18.3
Liquid Fuel	22.2	35.4	35.5
Coal/Coke	33.5	18.6	5.9
Wood	25.4	13.4	4.4
Other	3.0	0.4	0.2
None	1.1	0.6	0.4

Source: U.S. Census of Housing, as reported in American Gas Association's
Gas Facts.

Residential Appliance Data for Montana
from 1970 U.S. Census of Housing
(as reported in AGA Gas Facts, 1971)

Fuel Type	Cooking			Home Heating			Water Heating		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Total Units	121,200 100%	96,100 100%	217,300 100%	121,200 100%	96,100 100%	217,300 100%	121,200 100%	96,100 100%	217,300 100%
Utility Gas	39,400 32.5%	15,100 15.7%	54,500 25.1%	113,800 93.9%	37,300 38.8%	151,100 69.5%	105,300 86.9%	29,900 30.4%	134,500 61.9%
Electricity	78,700 64.9%	64,100 66.7%	142,800 65.7%	1,700 1.4%	6,800 7.1%	8,500 3.9%	13,800 11.4%	50,600 52.7%	64,400 29.6%
Bottled Gas	1,700 1.4%	12,700 13.2%	14,400 6.6%	1,500 1.2%	17,000 17.7%	18,500 8.5%	1,100 0.9%	9,700 10.1%	10,800 5.0%
Liquid Fuel	1/ 0.0%	500 0.5%	500 0.5%	3,100 2.6%	26,800 28.0%	29,900 13.8%	100 0.1%	600 0.6%	700 0.3%
Coal/Coke	100 0.1%	700 0.7%	800 0.4%	600 0.5%	3,900 4.1%	4,500 2.1%	0 0.0%	100 0.1%	100 0.1%
Wood	500 0.4%	2,400 2.5%	2,900 1.3%	200 0.2%	3,900 4.1%	4,100 1.9%	100 0.1%	500 0.5%	600 0.3%
Other	1/ 0.0%	100 0.1%	100 0.1%	300 0.2%	400 0.4%	700 0.3%	1/ 0.0%	100 0.1%	100 0.1%
None	800 0.7%	500 0.5%	1,300 0.6%	0 0.0%	1/ 0.0%	1/ 0.0%	800 0.7%	5,300 5.5%	6,100 2.8%

1/ less than 50.

Fuel Type	Clothes Drying		
	Urban	Rural	Total
Total Units	121,200 100%	96,100 100%	217,300 100%
Gas Heated	4,600 3.8%	2,700 2.8%	7,300 3.4%
Electricity	60,100 49.6%	52,600 54.7%	112,700 51.9%
None	56,500 46.6%	40,800 42.5%	97,300 44.8%

Residential Appliance Data for the United States
from 1970 U. S. Census of Housing
As Reported in AGA "Gas Facts", 1971
(Data in 1000's of Housing Units)

Fuel Type	<u>Cooking</u>			<u>Home Heating</u>			<u>Water Heating</u>		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Total Units	47,649.8 100%	15,797.3 100%	63,447.1 100%	47,649.8 100%	15,797.3 100%	63,447.1 100%	47,649.8 100%	15,797.3 100%	63,447.1 100%
Utility Gas	28,306.9 59.4%	2,938.0 18.6%	31,244.9 49.2%	30,909.1 64.9%	4,104.8 26.0%	35,013.9 55.2%	31,656.0 66.4%	3,303.4 20.9%	34,959.4 55.1%
Electricity	17,394.2 36.5%	8,373.7 53.0%	25,767.9 40.6%	3,401.2 7.1%	1,474.8 9.3%	4,876.0 7.7%	8,648.7 18.2%	7,454.3 47.2%	16,103.0 25.4%
Bottled Gas	1,417.3 3.0%	3,896.6 24.7%	5,313.9 8.4%	919.8 1.9%	2,887.4 18.3%	3,807.2 6.0%	962.0 2.0%	2,182.7 13.8%	3,144.7 5.0%
Liquid Fuel	192.4 0.4%	110.5 0.7%	302.9 0.5%	10,862.5 22.8%	5,610.9 35.5%	16,473.4 26.0%	5,248.1 11.0%	952.6 6.0%	6,200.7 9.8%
Coal/Coke	61.3 0.1%	95.2 0.6%	156.5 0.2%	889.8 1.9%	930.9 5.9%	1,820.7 2.9%	377.6 0.8%	81.4 0.5%	459.0 0.7%
Wood	62.5 0.1%	342.6 2.2%	405.1 0.6%	93.7 0.2%	700.6 4.4%	794.3 1.3%	12.8 0.0%	34.4 0.2%	447.2 0.7%
Other	30.0 0.1%	12.5 0.1%	42.5 0.1%	238.0 0.5%	28.3 0.2%	266.3 0.4%	120.3 0.3%	11.7 0.1%	132.0 0.2%
None	185.2 0.4%	28.2 0.2%	213.4 0.3%	335.7 0.7%	59.6 0.4%	395.3 0.6%	624.3 1.3%	1,776.8 11.2%	2,401.1 3.8%

Fuel Type	<u>Clothes Drying</u>		
	Urban	Rural	Total
Total Units	47,649.8 100%	15,797.3 100%	63,447.1 100%
Gas Heated	6,780.4 14.2%	1,059.3 6.7%	7,839.7 12.4%
Electricity	12,770.5 26.8%	5,866.1 37.1%	18,636.6 29.4%
None	28,098.9 59.0%	8,871.9 56.2%	36,970.8 58.3%

Residential Appliance Data for Montana
from 1960 U. S. Census of Housing
(as reported in AGA Gas Facts, 1961)

Fuel Type	<u>Cooking</u>			<u>Home Heating</u>			<u>Water Heating</u>		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Total Units	107,500 100%	94,700 100%	202,200 100%	107,500 100%	94,700 100%	202,200 100%	107,500 100%	94,700 100%	202,200 100%
Utility Gas	44,600 41.5%	15,500 16.4%	60,100 29.7%	94,700 88.1%	28,800 30.4%	123,500 61.1%	87,400 81.3%	22,300 23.5%	109,700 54.3%
Electricity	57,600 53.6%	54,700 57.8%	112,300 55.5%	700 0.7%	2,000 2.1%	2,700 1.3%	14,800 13.8%	45,400 47.9%	60,200 29.8%
Bottled Gas	2,400 2.2%	12,500 13.2%	14,900 7.4%	1,000 0.9%	9,500 10.0%	10,500 5.2%	1,100 1.0%	5,800 6.1%	6,900 3.4%
Liquid Fuel	100 0.1%	900 1.0%	1,000 0.5%	6,900 6.4%	31,600 33.4%	38,500 19.0%	200 0.2%	1,900 2.0%	2,100 1.0%
Coal/Coke	500 0.5%	3,300 3.5%	3,800 1.9%	2,500 2.3%	11,500 12.1%	14,000 6.9%	400 0.4%	1,100 1.2%	1,500 0.7%
Wood	1,200 1.1%	7,000 7.4%	8,200 4.1%	1,100 1.0%	10,600 11.2%	11,700 5.8%	600 0.6%	1,900 2.0%	2,500 1.2%
Other	1/ 0.0%	200 0.2%	200 0.1%	600 0.6%	600 0.6%	1,200 0.6%	100 0.1%	300 0.3%	400 0.2%
None	1,100 1.0%	600 0.6%	1,700 0.8%	0 0.0%	100 0.1%	100 0.1%	2,900 2.7%	16,000 16.9%	18,900 9.3%

1/ Less than 50.

Fuel Type	<u>Clothes Drying</u>		
	Urban	Rural	Total
Total Units	107,500 100%	94,700 100%	202,200 100%
Gas Heated	2,200 2.0%	1,500 1.6%	3,700 1.8%
Electricity	27,500 25.6%	28,000 29.6%	55,500 27.4%
None	77,800 72.4%	65,200 68.8%	143,000 70.7%

Residential Appliance Data for the United States
from 1960 U. S. Census of Housing
As Reported in AGA "Gas Facts", 1961
(Data in 1000's of Housing Units)

Fuel Type	<u>Cooking</u>			<u>Home Heating</u>			<u>Water Heating</u>		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Total Units	38,320.5 100%	14,703.6 100%	53,024.1 100%	38,320.5 100%	14,703.6 100%	53,024.1 100%	38,320.5 100%	14,703.6 100%	53,024.1 100%
Utility Gas	25,193.9 65.7%	2,102.8 14.3%	27,296.7 51.5%	20,418.2 53.3%	2,433.5 16.6%	22,851.7 43.1%	23,134.9 60.4%	2,105.5 14.3%	25,240.4 47.6%
Electricity	9,916.9 25.9%	6,433.9 43.8%	16,350.8 30.8%	586.5 1.5%	346.6 2.4%	933.1 1.8%	5,390.3 14.1%	5,408.8 36.8%	10,799.1 20.4%
Bottled Gas	2,153.2 5.6%	4,338.4 29.5%	6,491.6 12.2%	822.1 2.1%	1,863.7 12.7%	2,685.8 5.1%	1,182.4 3.1%	1,963.7 13.4%	3,146.1 5.9%
Liquid Fuel	289.5 0.8%	275.4 1.9%	564.9 1.1%	11,950.9 31.2%	5,197.8 35.4%	17,148.7 32.3%	5,360.9 14.0%	839.1 5.7%	6,200.0 11.7%
Coal/Coke	242.9 0.6%	314.1 2.1%	557.0 1.1%	3,713.0 9.7%	2,739.2 18.6%	6,452.2 12.2%	1,310.6 3.4%	244.7 1.7%	1,555.3 2.9%
Wood	253.3 0.7%	1,178.5 8.0%	1,431.8 2.7%	285.6 0.7%	1,965.8 13.4%	2,251.4 4.2%	53.6 0.1%	108.6 0.7%	162.2 0.3%
Other	22.8 0.1%	28.3 0.2%	51.1 0.1%	161.3 0.4%	61.6 0.4%	222.9 0.4%	105.0 0.3%	27.1 0.2%	132.1 0.2%
None	248.0 0.6%	32.2 0.2%	280.2 0.5%	382.9 1.0%	95.4 0.6%	478.3 0.9%	1,782.8 4.7%	4,006.1 27.2%	5,788.9 10.9%

Fuel Type	<u>Clothes Drying</u>		
	Urban	Rural	Total
Total Units	38,320.5 100%	14,703.6 100%	53,024.1 100%
Gas Heated	2,379.7 6.2%	397.7 2.7%	2,777.4 5.2%
Electricity	4,129.5 10.8%	2,179.6 14.8%	6,309.1 11.9%
None	31,811.3 83.0%	12,126.3 82.5%	43,937.6 82.9%

Residential Appliance Data for Montana
from 1950 U. S. Census of Housing
(as reported in AGA Gas Facts, 1951)

<u>Fuel Type</u>	<u>Cooking</u>			<u>Home Heating</u>		
	<u>Urban</u>	<u>Rural</u>	<u>Total</u>	<u>Urban</u>	<u>Rural</u>	<u>Total</u>
Total Units	79,700 100%	92,300 100%	172,000 100%	79,700 100%	92,300 100%	172,000 100%
Utility Gas	47,700 59.8%	14,500 15.7%	62,200 36.2%	57,700 72.4%	16,400 17.8%	74,100 43.1%
Electricity	22,100 27.7%	21,600 23.4%	43,700 25.4%	-- --	-- --	-- --
Bottled Gas	1,300 1.6%	9,300 10.1%	10,600 6.2%	500 0.6%	2,300 2.5%	2,800 1.6%
Liquid Fuel	700 0.9%	5,900 6.4%	6,600 3.8%	7,800 9.8%	28,400 30.8%	36,200 21.0%
Coal/Coke	5,100 6.4%	20,400 22.1%	25,500 14.8%	9,300 11.7%	25,900 28.1%	35,200 20.5%
Wood	2,400 3.0%	19,500 21.1%	21,900 12.7%	2,600 3.3%	16,700 18.1%	19,300 11.2%
Other	100 0.1%	400 0.4%	500 0.3%	1,700 2.1%	2,500 2.7%	4,200 2.4%
None	300 0.4%	700 0.8%	1,000 0.6%	100 0.1%	100 0.1%	200 0.1%

Residential Appliance Data for the United States
from 1950 U. S. Census of Housing
As Reported in AGA "Gas Facts", 1951
(Data in 1000's of Housing Units)

<u>Fuel Type</u>	<u>Urban</u>	<u>Cooking</u>		<u>Total</u>	<u>Urban</u>	<u>Home Heating</u>		<u>Total</u>
		<u>Rural</u>				<u>Rural</u>		
Total Units	28,014.2 100%	14,086.3 100%		42,100.5 100%	27,860.9 100%	13,968.4 100%		41,829.3 100%
Utility Gas	19,897.4 71.0%	1,813.1 12.9%		21,710.5 51.6%	9,799.6 35.2%	1,322.3 9.5%		11,121.9 26.6%
Electricity	3,446.8 12.3%	2,848.4 20.2%		6,295.2 15.0%	-- --	-- --		-- --
Bottled Gas	808.9 2.9%	2,550.5 18.1%		3,359.4 8.0%	230.5 0.1%	745.5 5.3%		976.0 2.3%
Liquid Fuel	1,353.9 4.8%	1,480.6 10.5%		2,834.5 6.7%	6,364.2 22.8%	3,096.9 22.2%		9,461.1 22.6%
Coal/Coke	1,614.0 5.8%	1,681.2 11.9%		3,295.2 7.8%	9,806.6 35.2%	4,676.5 33.5%		14,483.1 34.6%
Wood	667.1 2.4%	3,483.1 24.7%		4,150.2 9.9%	617.9 2.2%	3,553.3 25.4%		4,171.2 10.0%
Other	138.3 0.5%	195.6 1.4%		333.9 0.8%	620.1 2.2%	425.4 3.0%		1,045.5 2.5%
None	87.8 0.3%	33.8 0.2%		121.6 0.3%	422.0 1.5%	148.5 1.1%		570.5 1.4%

THE MONTANA POWER COMPANY

RESIDENTIAL APPLIANCE SATURATION SURVEY

JANUARY, 1974

Attached are the results of a survey which represents a sampling of approximately 3% of our individually metered, residential, electric customers.

Data Processing machines determined the customers to be interviewed by marking with an asterisk each 33rd residential customer in each route. The Division Marketing Departments made the interviews almost entirely by telephone. The number of customers shown is the actual number billed during the January, 1974 billing period. The Data Processing Department tabulated all the information directly from the interview forms. The results have not been adjusted in any way.

Reliability is in direct ratio to the number of interviews - the larger the number, the greater is the percent of reliability. However, a 100% or 0% saturation should not be considered as absolute in any case.

In comparing the saturation figures shown in this survey with those of previous years, the increase in number of customers should also be considered to arrive at actual growth.

THE MONTANA POWER COMPANY

RESIDENTIAL APPLIANCE SATURATION SURVEY - JANUARY, 1974

ALL TYPES OF HOMES - INDIVIDUALLY METERED

	BILLINGS DIVISION	BOZ.-LIV. DIVISION	BUTTE DIVISION	GREAT FALLS DIVISION	HELENA DIVISION	LEWISTOWN DIVISION	MISSOULA DIVISION	ELEC. SYSTEM TOTALS
Number of Customers	34,441	16,776	25,700	39,623	15,451	5,129	26,830	163,750
Number Interviewed	969	507	773	1,254	469	158	809	4,939
1. HOMES BY TYPE:								
Single-family house	76.9%	71.6%	84.2%	78.7%	80.8%	79.1%	73.7%	77.6%
Multi-family building	13.3	16.4	10.2	13.8	12.4	13.3	13.2	13.2
Mobile Home	9.8	12.0	5.6	7.5	6.8	7.6	13.1	8.9
2. RANGE OR STOVE:								
Electric	69.3%	79.5%	74.9%	80.3%	84.2%	88.6%	81.5%	78.2%
Natural Gas	29.2	17.3	23.5	17.7	11.7	5.7	14.1	19.3
Bottled Gas	1.5	2.6	.6	1.4	3.9	5.7	2.8	2.1
Other	0	.4	.6	.4	.2	0	.5	.3
None	0	.2	.3	.2	0	0	.1	.1
3. MICROWAVE OVEN:								
Yes	2.8%	1.6%	2.4%	3.3%	1.5%	3.2%	1.9%	2.5%
No	97.2	98.4	97.6	96.7	98.5	96.8	98.1	97.5
4. CLOTHES DRYER:								
Electric	65.2%	69.2%	67.1%	70.6%	72.1%	70.9%	69.2%	68.4%
Natural Gas	8.9	2.9	2.0	4.3	.6	1.3	2.1	3.2
Bottled Gas	.3	.3	0	.2	.6	.6	.6	.3
None	25.6	27.6	30.9	24.9	26.7	27.2	28.1	27.7
5. CLOTHES WASHER:								
Automatic	82.1%	79.6%	82.4%	82.4%	82.7%	75.3%	77.1%	81.1%
Wringer Type	4.9	8.5	6.2	4.8	7.1	17.7	3.5	5.7
None	13.0	11.9	11.4	12.8	10.2	7.0	19.4	13.2
6. REFRIGERATOR:								
One or More	99.3%	99.4%	99.7%	99.8%	100.0%	99.4%	99.7%	99.7%
None	.7	.6	.3	.2	0	.6	.3	.3
More Than One	9.7	7.9	2.6	2.3	11.1	8.2	2.1	5.4
a. Types In "One or More":								
Straight Refrigerator	41.8%	46.9%	50.9%	40.5%	40.4%	57.6%	48.2%	44.7%
Refrigerator-Freezer	58.2	53.1	49.1	59.5	59.6	42.4	51.8	55.3
b. Types In "Refrig.-Freezer":								
Automatic Defrost								
Refrig. Section Only	21.2%	23.1%	22.4%	19.5%	21.2%	32.9%	21.4%	21.5%
Both Sections	72.4	64.4	62.3	66.9	67.8	57.5	59.5	65.2
Neither	6.4	12.5	15.3	13.6	11.0	9.6	19.6	13.3
7. SEPARATE FOOD FREEZER:								
One or More	58.9%	67.5%	50.5%	65.7%	60.8%	74.7%	63.9%	62.2%
None	39.1	32.5	49.5	34.3	39.2	25.3	36.1	37.9
More Than One	.2	4.9	1.7	3.7	4.3	5.7	3.1	3.2
8. ELECTRIC DISHWASHER:								
Portable	13.0%	19.0%	21.7%	19.9%	22.0%	13.9%	19.0%	18.6%
Built-in	21.8	21.5	17.1	20.2	23.9	18.4	18.3	21.1
None	65.2	59.5	61.2	59.9	54.1	67.7	62.7	61.3
9. TELEVISION:								
One or More	98.7%	94.1%	99.1%	97.7%	98.5%	96.2%	96.5%	97.4%
None	1.3	5.9	.9	2.3	1.5	3.8	3.5	2.6
a. Breakdown of "One or More":								
Color Only	47.7%	53.7%	63.7%	62.3%	62.1%	55.3%	54.3%	57.7%
Black and White Only	26.6	37.3	24.2	22.6	27.3	36.8	35.7	28.3
Both Types	25.7	9.0	12.1	14.9	10.6	7.9	9.1	14.4
10. REFRIG. AIR CONDITIONING:								
Yes	26.3%	8.1%	2.1%	17.7%	9.0%	9.5%	8.4%	13.4%
No	73.7	91.9	97.9	82.3	91.0	90.5	91.6	86.6
a. Breakdown of "Yes":								
One or More Room Units	75.6%	75.7%	58.8%	75.7%	76.2%	80.0%	72.7%	75.7%
Central System	24.4	24.3	41.2	24.3	23.8	20.0	27.3	24.3
b. Types of "Central Systems":								
Electric	97.0%	100.0%	100.0%	94.0%	60.0%	100.0%	94.4%	93.4%
Natural Gas	3.0	0	0	6.0	40.0	0	5.6	6.6
11. WATER HEATING:								
Electric	8.0%	23.9%	12.2%	15.1%	21.3%	46.8%	27.0%	17.4%
Natural Gas	89.9	69.0	85.4	81.6	72.3	50.7	69.7	78.7%
Bottled Gas	1.8	5.7	1.0	2.2	4.9	2.5	2.1	2.3
Other	.1	.8	1.0	.1	.6	0	.6	.4
None	.2	.6	.4	1.0	.9	0	0	.5
12. SPACE HEATING:								
Electricity	1.0%	4.7%	1.8%	1.9%	1.5%	1.9%	3.7%	2.3%
Natural Gas	92.0	74.0	89.5	86.3	76.5	63.3	79.1	83.8
Bottled Gas	2.3	8.9	2.8	5.2	9.2	8.9	3.8	4.6
Oil	2.0	11.0	3.4	6.1	10.9	21.5	11.5	7.1
Other	2.7	1.6	2.5	.5	1.9	4.4	1.9	1.9
13. OUTDOOR LIGHTING - POST/POLE:								
Electric	17.4%	30.6%	11.4%	13.0%	7.9%	23.4%	19.2%	16.3%
Natural Gas	0	0	0	0	0	0	0	0

THE MONTANA POWER COMPANY

RESIDENTIAL APPLIANCE SATURATION SURVEY - JANUARY, 1974

SINGLE FAMILY HOUSES ONLY - INDIVIDUALLY METERED

	BILLINGS DIVISION	BOZ.-LIV. DIVISION	BUTTE DIVISION	GREAT FALLS DIVISION	HELENA DIVISION	LEWISTOWN DIVISION	MISSOULA DIVISION	ELEC. SYSTEM TOTALS
Customers in S. F. Houses Number Interviewed	26,485 745	12,012 363	21,640 651	31,183 987	12,484 379	4,057 125	19,626 596	127,487 3,846
2. RANGE OR STOVE:								
Electric	75.7%	83.8%	77.9%	85.7%	88.4%	92.8%	86.6%	82.8%
Natural Gas	23.6	14.3	20.9	12.6	9.4	4.0	10.7	15.4
Bottled Gas	.7	1.3	.5	1.0	2.1	3.2	1.8	1.3
Other	0	.3	.5	.5	.2	0	.7	.4
None	0	.3	.2	.2	0	0	.2	.1
3. MICROWAVE OVEN:								
Yes	2.4%	2.0%	2.7%	3.8%	1.3%	1.6%	1.7%	2.5%
No	97.6	98.0	97.3	96.2	98.7	98.4	98.3	97.5
4. CLOTHES DRYER:								
Electric	69.6%	71.3%	70.4%	76.9%	75.7%	76.0%	76.0%	73.6%
Natural Gas	9.4	3.3	2.1	4.6	.5	.8	2.0	4.1
Bottled Gas	.1	0	.2	0	.8	.8	.5	.2
None	20.6	25.4	27.3	18.5	23.0	22.4	21.5	22.1
5. CLOTHES WASHER:								
Automatic	86.3%	82.6%	85.7%	87.6%	86.0%	76.8%	84.2%	85.5%
Wringer Type	5.6	10.8	6.3	5.1	7.7	18.4	3.9	6.4
None	8.1	6.6	8.0	7.3	6.3	4.8	11.9	8.1
6. REFRIGERATOR:								
One or More	99.1%	99.2%	99.8%	99.8%	100.0%	99.2%	99.7%	99.6%
None	.9	.8	.2	.2	0	.8	.3	.4
More Than One	11.2	9.4	2.6	2.3	11.9	10.4	0	6.0
a. Types In "One or More":								
Straight Refrigerator	38.0%	43.8%	47.8%	38.0%	37.6%	55.2%	45.0%	41.8%
Refrigerator-Freezer	62.0	66.2	52.2	62.0	62.4	44.8	55.0	58.2
b. Types In "Refrig.-Freezer":								
Automatic Defrost	20.2%	22.7%	22.3%	19.4%	19.7%	34.4%	19.3%	20.7%
Refrig. Section Only	75.7	67.2	63.6	69.0	70.3	57.4	67.0	68.9
Both Sections	4.1	10.1	14.1	11.6	10.0	8.2	13.7	10.4
Neither								
7. SEPARATE FOOD FREEZER:								
One or More	69.0%	77.6%	54.5%	72.7%	66.0%	81.6%	72.1%	68.9%
None	31.0	22.4	45.5	27.3	34.0	18.4	27.9	31.1
More Than One	2.2	6.4	1.5	3.6	4.8	5.6	3.0	3.3
8. ELECTRIC DISHWASHER:								
Portable	14.8%	20.4%	23.3%	22.2%	23.5%	16.0%	22.3%	20.7%
Built-in	25.5	23.0	18.4	22.5	28.2	20.0	21.3	22.7
None	59.7	56.6	58.2	55.3	48.3	64.0	56.4	56.6
9. TELEVISION:								
One or More	99.3%	93.9%	99.1%	97.5%	98.7%	96.8%	97.0%	97.8%
None	.7	6.1	.9	2.5	1.3	3.2	3.0	2.2
a. Breakdown of "One or More":								
Color Only	48.7%	50.1%	62.5%	62.7%	63.5%	57.9%	56.4%	57.7%
Black and White Only	21.7	39.3	24.5	20.8	24.7	32.2	32.8	25.9
Both Types	29.6	10.6	13.0	16.5	11.8	9.9	10.8	16.4
10. REFRIG. AIR CONDITIONING:								
Yes	25.9%	6.6%	1.9%	15.8%	8.2%	7.2%	8.0%	12.3%
No	74.1	93.4	98.1	84.2	91.8	92.8	92.0	87.7
a. Breakdown of "Yes":								
One or More Room Units	77.9%	90.0%	66.7%	74.2%	75.9%	80.0%	76.1%	76.6%
Central System	22.1	10.0	33.3	25.8	24.1	20.0	23.9	23.4
b. Types of "Central Systems":								
Electric	95.5%	100.0%	100.0%	92.1%	71.4%	100.0%	91.7%	92.7%
Natural Gas	4.5	0	0	7.9	28.6	0	8.3	7.3
11. WATER HEATING:								
Electric	8.3%	27.8%	13.5%	16.1%	23.7%	54.4%	30.4%	19.5%
Natural Gas	90.0	67.0	84.5	80.7	70.7	44.8	67.6	77.6
Bottled Gas	1.3	3.6	.4	1.9	4.0	.8	1.2	1.8
Other	.1	.8	.8	.1	.5	0	.8	.4
None	.3	.8	.8	1.2	.1	0	0	.7
12. SPACE HEATING:								
Electricity	.7%	4.7%	2.2%	2.1%	1.6%	2.4%	3.7%	2.3%
Natural Gas	91.8	72.4	88.6	84.8	75.7	60.0	78.0	82.9
Bottled Gas	1.9	7.2	2.6	5.3	8.7	6.4	3.2	4.4
Oil	2.1	13.5	3.7	7.2	11.6	26.4	12.9	8.2
Other	3.5	2.2	2.9	.6	2.4	4.8	2.2	2.2
13. OUTDOOR LIGHTING - POST/POLE:								
Electric	16.9%	30.6%	12.0%	13.8%	9.0%	24.0%	19.9%	16.5%
Natural Gas	.9	.5	0	.5	.3	0	0	.4
None	82.2	68.9	88.0	85.7	90.7	76.0	80.1	83.1

THE MONTANA POWER COMPANY

RESIDENTIAL APPLIANCE SATURATION SURVEY - JANUARY, 1974

CUSTOMERS IN MULTI-FAMILY BUILDINGS - INDIVIDUALLY METERED

	BILLINGS DIVISION	BOZ.-LIV. DIVISION	BUTTE DIVISION	GREAT FALLS DIVISION	HELENA DIVISION	LEWISTOWN DIVISION	MISSOULA DIVISION	ELEC. SYSTEM TOTALS
Customers in M. F. Buildings Number Interviewed	4,581 129	2,751 83	2,621 79	5,468 173	1,916 58	682 21	3,515 107	21,534 650
2. RANGE OR STOVE:								
Electric	73.6%	85.5%	63.3%	76.3%	77.6%	100.0%	93.5%	79.0%
Natural Gas	26.4	13.3	34.1	23.7	22.4	0	5.6	20.3
Bottled Gas	0	0	0	0	0	0	.9	.2
Other	0	1.2	1.3	0	0	0	0	.3
None	0	0	1.3	0	0	0	0	.2
3. MICROWAVE OVEN:								
Yes	6.2%	0 %	1.3%	1.7%	1.7%	4.8%	2.8%	2.6%
No	93.8	100.0	98.7	98.3	98.3	95.2	97.2	97.4
4. CLOTHES DRYER:								
Electric	45.7%	54.2%	40.5%	38.7%	50.0%	33.3%	43.0%	43.9%
Natural Gas	7.0	1.2	0	4.6	1.7	4.8	2.8	3.5
Bottled Gas	1.5	0	0	.6	0	0	1.9	.8
None	45.7	44.6	59.5	56.1	48.3	61.9	52.3	51.8
5. CLOTHES WASHER:								
Automatic	65.9%	62.7%	58.2%	55.5%	63.8%	60.0%	50.5%	58.8%
Wringer Type	2.3	3.6	8.9	5.2	6.9	20.0	1.9	4.9
None	31.8	33.7	32.9	39.3	29.3	25.0	47.6	36.3
6. REFRIGERATOR:								
One or More	100.0%	100.0%	98.7%	99.4%	100.0%	100.0%	100.0%	99.7%
None	0	0	1.3	.6	0	0	0	.3
More Than One	7.0	6.0	0	3.4	6.9	0	.9	4.3
a. Types in "One or More":								
Straight Refrigerator	59.7%	61.4%	65.4%	55.5%	56.9%	90.5%	63.2%	60.8%
Refrigerator-Freezer	40.3	38.6	34.6	44.5	43.1	9.5	36.8	39.2
b. Types in "Refrig.-Freezer":								
Automatic Defrost								
Refrig. Section Only	24.0%	18.2%	14.3%	17.6%	26.9%	50.0%	20.0%	20.2%
Both Sections	54.0	66.7	57.1	63.5	57.7	50.0	37.5	56.5
Neither	22.0	15.1	28.6	18.9	15.4	0	42.5	23.3
7. SEPARATE FOOD FREEZER:								
One or More	27.1%	41.0%	25.3%	35.8%	24.1%	38.1%	33.6%	32.2%
None	72.9	59.0	74.7	64.2	75.9	61.9	66.4	67.8
More Than One	1.5	1.2	2.5	3.4	1.7	4.8	2.8	2.5
8. ELECTRIC DISHWASHER:								
Portable	6.2%	14.5%	13.9%	11.0%	13.8%	0 %	9.4%	10.5%
Built-in	9.3	16.8	5.1	13.9	3.4	0	6.5	9.7
None	84.5	68.7	81.0	75.1	82.8	100.0	84.1	79.8
9. TELEVISION:								
One or More	96.1%	95.2%	98.7%	97.7%	98.3%	95.2%	96.3%	96.9%
None	3.9	4.8	1.3	2.3	1.7	4.8	3.7	3.1
a. Breakdown of "One or More":								
Color Only	41.4%	58.2%	64.1%	58.0%	54.4%	30.0%	42.7%	52.1%
Black and White Only	45.3	36.7	29.5	32.5	42.1	70.0	54.4	41.2
Both Types	9.3	5.1	6.4	9.5	3.5	0	2.9	6.7
10. REFRIG. AIR CONDITIONING:								
Yes	32.6%	7.3%	2.6%	21.4%	6.9%	9.5%	6.5%	15.4%
No	67.4	92.7	97.4	78.6	93.1	90.5	93.5	84.6
a. Breakdown of "Yes":								
One or More Room Units	68.9%	85.7%	66.7%	84.2%	60.0%	100.0%	100.0%	77.6%
Central System	31.1	14.3	33.3	15.8	40.0	0	0	22.4
b. Types of "Central Systems":								
Electric	100.0%	100.0%	100.0%	100.0%	100.0%	0 %	0 %	100.0%
Natural Gas	0	0	0	0	0	0	0	0
11. WATER HEATING:								
Electric	5.4%	10.8%	2.5%	5.8%	3.5%	23.8%	12.2%	7.4%
Natural Gas	94.6	86.8	97.5	93.6	94.8	76.2	86.9	91.8
Bottled Gas	0	1.2	0	0	1.7	0	.9	.4
Other	0	1.2	0	0	0	0	0	.2
None	0	0	0	.6	0	0	0	.2
12. SPACE HEATING:								
Electricity	3.9%	6.0%	0 %	.6%	1.7%	0 %	1.9%	2.2%
Natural Gas	96.1	89.2	100.0	97.1	96.6	0	93.5	95.2
Bottled Gas	0	2.4	0	.6	0	0	.9	.8
Oil	0	2.4	0	1.1	1.7	0	3.7	1.5
Other	0	0	0	.6	0	0	0	.3
13. OUTDOOR LIGHTING - POST/POLE:								
Electric	13.1%	18.1%	6.3%	9.8%	0 %	14.3%	15.0%	11.2%
Natural Gas	.8	0	0	.6	0	0	.9	.5
None	86.1	81.9	93.7	89.6	100.0	85.7	84.1	88.3

THE MONTANA POWER COMPANY

RESIDENTIAL APPLIANCE SATURATION SURVEY - JANUARY, 1974

CUSTOMERS IN MOBILE HOMES - INDIVIDUALLY METERED

	BILLINGS DIVISION	BOZ.-LIV. DIVISION	BUTTE DIVISION	GREAT FALLS DIVISION	HELENA DIVISION	LEWISTOWN DIVISION	MISSOULA DIVISION	ELEC. SYSTEM TOTALS
Customers in Mobile Homes Number Interviewed	3,375 95	2,013 61	1,439 43	2,972 94	1,051 32	390 12	3,489 106	14,729 443
2. RANGE OR STOVE:								
Electric	13.7%	45.9%	51.2%	30.9%	46.9%	25.0%	48.1%	36.3%
Natural Gas	76.8	41.0	44.2	60.6	21.9	33.3	41.5	51.7
Bottled Gas	9.5	13.1	4.6	8.5	31.2	41.7	10.4	12.0
Other	0	0	0	0	0	0	0	0
None	0	0	0	0	0	0	0	0
3. MICROWAVE OVEN:								
Yes	1.0%	1.6%	0 %	1.1%	3.1%	16.7%	1.9%	1.8%
No	99.0	98.4	100.0	98.9	96.9	83.3	98.1	98.2
4. CLOTHES DRYER:								
Electric	54.7%	77.1%	67.4%	62.8%	68.8%	83.3%	57.5%	63.2%
Natural Gas	7.4	3.3	4.7	1.1	0	0	1.9	3.2
Bottled Gas	0	1.6	0	2.1	0	0	0	3.7
None	37.9	18.0	27.9	34.0	31.2	16.7	40.6	32.9
5. CLOTHES WASHER:								
Automatic	71.6%	85.3%	79.1%	76.6%	78.1%	91.7%	64.2%	74.5%
Wringer Type	2.1	1.6	0	1.1	0	8.3	2.8	1.8
None	26.3	13.1	20.9	22.3	21.9	0	33.0	23.7
6. REFRIGERATOR:								
One or More	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
None	0	0	0	0	0	0	0	0
More Than One	2.1	1.6	0	0	9.4	0	1.9	1.8
a. Types In "One or More":								
Straight Refrigerator	47.4%	45.9%	55.8%	39.4%	43.8%	25.0%	50.9%	46.3%
Refrigerator-Freezer	52.6	54.1	44.2	60.6	56.2	75.0	49.1	53.7
b. Types In "Refrig.-Freezer":								
Automatic Defrost								
Refrig. Section Only	28.0%	30.3%	36.8%	22.8%	33.3%	20.0%	39.6%	30.4%
Both Sections	60.0	45.5	47.4	49.1	50.0	60.0	30.2	47.1
Neither	12.0	24.2	15.8	28.1	16.7	20.0	30.2	22.5
7. SEPARATE FOOD FREEZER:								
One or More	42.5%	44.2%	34.9%	45.7%	65.6%	66.7%	48.1%	46.4%
None	57.5	55.8	65.1	54.3	34.4	33.3	51.9	53.6
More Than One	2.1	1.6	2.2	4.4	3.1	8.3	3.8	3.2
8. ELECTRIC DISHWASHER:								
Portable	8.4%	16.4%	11.6%	11.7%	18.7%	16.7%	10.4%	12.0%
Built-in	9.5	19.7	18.6	8.5	9.4	33.3	13.2	13.1
None	82.1	63.9	69.8	79.8	71.9	50.0	76.4	74.9
9. TELEVISION:								
One or More	96.8%	93.4%	100.0%	100.0%	96.9%	91.7%	94.3%	96.6%
None	3.2	6.6	0	0	3.1	8.3	5.7	3.4
a. Breakdown of "One or More":								
Color Only	45.7%	68.4%	81.4%	69.1%	58.1%	66.7%	54.0%	61.0%
Black and White Only	39.1	26.3	9.3	23.4	32.2	33.3	41.0	30.6
Both Types	15.2	5.3	9.3	7.5	9.7	0	5.0	8.4
10. REFRIG. AIR CONDITIONING:								
Yes	21.3%	18.3%	4.7%	30.9%	21.9%	33.3%	12.3%	19.5%
No	78.7	81.7	95.3	69.1	78.1	66.7	87.7	80.5
a. Breakdown of "Yes":								
One or More Room Units	68.2%	40.0%	0 %	72.4%	87.5%	66.7%	46.2%	63.2%
Central System	31.8	60.0	100.0	27.6	12.5	33.3	53.8	36.8
b. Types of "Central Systems":								
Electric	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Natural Gas	0	0	0	0	0	0	0	0
11. WATER HEATING:								
Electric	9.5%	18.0%	9.3%	21.3%	25.0%	8.3%	27.4%	18.5%
Natural Gas	83.1	57.4	76.7	70.2	50.0	66.7	64.1	68.8
Bottled Gas	7.4	24.6	9.3	8.5	21.9	25.0	8.5	12.0
Other	0	0	4.7	0	3.1	0	0	.7
None	0	0	0	0	0	0	0	0
12. SPACE HEATING:								
Electricity	0 %	3.3%	0 %	2.1%	0 %	0 %	5.7%	2.3%
Natural Gas	88.4	62.3	83.7	81.9	50.0	58.3	70.7	75.2
Bottled Gas	8.4	26.2	11.6	12.8	31.3	41.7	10.4	15.1
Oil	3.2	8.2	4.7	3.2	18.7	0	11.3	7.0
Other	0	0	0	0	0	0	1.9	.4
13. OUTDOOR LIGHTING - POST/POLE:								
Electric	27.4%	47.5%	12.2%	10.6%	9.4%	33.3%	19.8%	22.2%
Natural Gas	0	0	0	6.4	0	0	0	1.4
None	72.6	52.5	87.8	83.0	90.6	66.7	80.2	76.4

THE MONTANA POWER COMPANY
RESIDENTIAL APPLIANCE SATURATION SURVEY
JANUARY, 1971

This survey represents a sampling of approximately 3% of all accounts in our electric residential classification of customers. The selection of customers to be sampled was determined by data processing machines which marked each 33rd electrical residential customer in each meter reading route on our system. These customers were interviewed primarily by telephone. In the event a customer could not be reached by phone, a personal call was made or the next customer in that route was substituted for interviewing.

The number of customers shown for each division and town is the actual number of customers billed during the January, 1971 billing period.

Results of the survey are shown as percentages of customers who have one or more of the appliances indicated. The figures are not adjusted in any way. Reliability is in direct ratio to the number of interviews. A 100% or 0% saturation should not be considered as absolute. Someone, someplace doesn't have or does have the appliance in question - a 3% sampling of a small number of customers may fail to pick up the exceptions or the sampling of a small number of customers may have become overweighted by exceptions.

Please note the subheadings in questions #5, 6, 8 and 9. These are further breakdowns of the "Yes" answers in the primary question. In question #9a, please note that customers with "central systems" are further classified as "electric" or "gas" systems.

THE MONTANA POWER COMPANY
RESIDENTIAL APPLIANCE SATURATION SURVEY - JANUARY, 1971
PERCENT SATURATIONS FOR ALL TYPES OF HOMES

	BILLINGS DIVISION	BOZEMAN DIVISION	BUTTE DIVISION	GREAT FALLS DIVISION	HELENA DIVISION	LEWISTOWN DIVISION	MISSOULA DIVISION	BY TEM TOTALS
Number of Customers Number Interviewed	30,817 1,010	14,675 435	24,654 665	37,384 1,184	13,727 464	4,049 101	23,479 600	100.7 2,600
1. TYPE OF HOME:								
Single-family house	79.5%	74.3%	82.6%	80.5%	75.4%	84.2%	77.6%	78.1%
Multi-family building	15.5	17.9	12.6	14.0	17.5	7.1	12.7	14.5
Mobile Home	5.0	7.8	4.8	5.5	7.1	7.1	7.7	6.1
2. RANGE:								
Electric	65.7%	72.5%	69.4%	75.7%	72.3%	84.8%	83.7%	74.5%
Natural Gas	32.3	16.6	28.1	22.0	16.2	7.3	14.2	22.6
Bottled Gas	1.3	3.4	.7	1.8	5.2	6.6	2.0	4.5
Other	.7	.5	.5	.3	1.9	1.3	.1	.6
None	0	0	.5	.2	.8	0	0	.2
3. CLOTHES DRYER:								
Electric	55.7%	63.9%	61.1%	63.4%	55.0%	69.6%	65.7%	60.8%
Natural Gas	7.1	1.4	1.4	5.2	1.5	3.3	1.7	3.8
Bottled Gas	.4	.2	0	0	.6	1.3	0	.2
None	36.8	34.5	37.6	31.4	42.9	35.8	32.6	35.2
4. CLOTHES WASHER:								
Automatic	76.0%	77.9%	76.2%	78.8%	70.1%	68.2%	76.4%	76.1%
Wringer Type	7.9	9.0	10.0	8.2	7.5	15.2	7.4	8.5
None	16.1	13.1	13.8	13.0	22.4	16.6	16.2	15.4
5. REFRIGERATOR:								
Yes	99.7%	99.8%	99.7%	99.8%	99.4%	100.0%	99.6%	99.7%
No	.3	.2	.3	.2	.6	0	.4	.3
a. Distribution of "Yes" Above:								
Refrig. only	56.6%	57.6%	59.7%	54.3%	64.9%	64.2%	63.2%	58.6%
Refrig.-Freezer	43.4	42.4	40.3	45.7	35.1	35.8	36.8	41.4
6. SEPARATE FOOD FREEZER:								
Yes	56.3%	65.3%	40.8%	55.8%	50.0%	57.0%	55.7%	54.1%
No	43.7	34.7	59.2	44.2	50.0	43.0	44.3	45.9
a. Distribution of "Yes" Above:								
Auto. defrost	14.9%	13.4%	29.2%	18.2%	22.4%	9.3%	11.8%	17.1%
No Auto. defrost	65.1	86.6	70.8	81.8	77.6	90.7	88.2	22.8
7. ELECTRIC DISHWASHER:								
Portable	11.8%	18.9%	13.1%	17.6%	15.7%	11.3%	17.4%	15.4%
Built-in	14.0	17.0	12.3	14.2	15.5	11.9	14.9	14.3
None	74.2	64.1	74.6	68.2	68.8	76.8	67.7	70.3
8. TELEVISION:								
Yes	97.1%	96.1%	98.3%	99.0%	95.0%	97.4%	96.3%	97.3%
No	2.9	3.9	1.7	1.0	5.0	2.6	3.7	2.7
a. Distribution of "Yes" Above:								
Color	37.6%	35.2%	44.7%	39.2%	43.3%	34.0%	30.2%	38.2%
Black & White	50.4	55.0	48.6	49.8	49.9	57.8	60.9	58.2
Both	12.0	9.8	6.7	11.0	6.8	8.2	8.9	9.6
9. REFRIG. TYPE AIR CONDITIONING:								
Yes	16.2%	5.3%	3.6%	10.4%	4.7%	4.6%	5.3%	8.7%
No	83.8	94.7	96.4	89.6	95.3	95.4	94.7	91.3
a. Distribution of "Yes" Above:								
Room units (1 or more)	79.3%	78.3%	91.7%	72.4%	68.2%	57.1%	81.1%	77.0%
Central systems	20.7	21.7	8.3	27.6	31.8	42.9	18.9	23.0
Electric	88.2	100.0	0	85.3	85.7	100.0	100.0	87.0
Natural Gas	11.8	0	100.0	14.7	14.3	0	0	13.0
10. WATER HEATED BY:								
Electricity	8.4%	22.3%	15.4%	14.2%	23.3%	51.0%	31.5%	18.1%
Natural Gas	89.7	69.9	83.2	82.2	67.2	43.7	66.3	77.7
Bottled Gas	1.3	6.2	.3	2.7	5.2	3.9	1.1	2.4
Other	.2	1.4	.2	.2	1.3	.7	1.1	.6
None	.4	.2	.9	.7	3.0	.7	0	.7
11. HOME HEATING BY:								
Electricity	.6%	3.0%	1.1%	1.6%	1.9%	4.0%	2.6%	1.7%
Natural Gas	92.4	74.5	89.0	86.2	72.4	60.9	81.0	83.5
Bottled Gas	1.3	8.0	1.3	5.8	12.3	5.3	2.7	4.6
Other	5.7	14.5	8.6	6.4	13.4	29.8	13.7	9.2
12. OUTDOOR LIGHTING:								
Electric	17.4%	21.4%	9.9%	10.4%	19.2%	11.9%	14.7%	14.5%
Natural Gas	7.8	0	0	3.8	.2	0	.6	2.8
None	74.8	78.6	90.1	85.8	80.6	88.1	84.7	82.7

THE MONTANA POWER COMPANY
RESIDENTIAL APPLIANCE SATURATION SURVEY - JANUARY, 1971
SINGLE-FAMILY HOUSES ONLY

	BILLINGS DIVISION	BOZEMAN DIVISION	BUTTE DIVISION	GREAT FALLS DIVISION	HELENA DIVISION	LEWISTOWN DIVISION	MISSOULA DIVISION	SYSTEM TOTALS
Number of Customers Number Interviewed	24,500 803	10,910 323	20,355 549	30,090 953	10,355 350	4,160 127	18,675 556	114,045 3,661
2. RANGE:								
Electric	71.5%	83.9%	74.4%	81.3%	82.0%	90.6%	87.4%	79.7%
Natural Gas	27.0	13.0	24.2	17.2	11.4	5.5	11.7	18.2
Bottled Gas	1.1	2.2	.4	1.0	3.4	2.4	.7	1.3
Other	.4	.9	.5	.4	2.3	1.5	.2	.6
None	0	0	.5	.1	.9	0	0	.2
3. CLOTHES DRYER:								
Electric	60.7%	68.7%	67.1%	70.6%	60.3%	64.6%	70.3%	66.5%
Natural Gas	7.6	1.9	1.6	5.3	1.1	3.9	1.8	4.0
Bottled Gas	.2	.3	0	0	.6	1.5	0	.2
None	31.5	29.1	31.3	24.1	38.0	30.0	27.9	29.3
4. CLOTHES WASHER:								
Automatic	80.0%	80.8%	81.4%	84.9%	72.8%	70.1%	80.6%	80.6%
Wringer Type	8.7	10.5	8.9	8.7	8.6	17.3	8.3	9.1
None	11.3	8.7	9.7	6.4	18.6	12.6	11.1	10.3
5. REFRIGERATOR:								
Yes	99.6%	99.7%	99.6%	99.8%	99.1%	100.0%	99.6%	99.6%
No	.4	.3	.4	.2	.9	0	.4	.4
a. Distribution of "Yes" Above:								
Refrig. only	53.5%	54.3%	56.9%	51.8%	64.0%	59.8%	60.6%	55.9%
Refrig.-Freezer	46.5	45.7	43.1	48.2	36.0	40.2	39.4	44.1
6. SEPARATE FOOD FREEZER:								
Yes	62.9%	75.9%	46.8%	63.7%	57.1%	62.2%	62.6%	61.2%
No	37.1	24.1	53.2	36.3	42.9	37.8	37.4	38.8
a. Distribution of "Yes" Above:								
Auto. Defrost	14.9%	11.8%	28.8%	18.3%	23.5%	10.1%	12.4%	17.3%
No Auto. Defrost	85.1	88.2	71.2	81.7	76.5	89.9	87.6	82.7
7. ELECTRIC DISHWASHER:								
Portable	13.6%	23.5%	14.6%	20.2%	17.4%	11.8%	19.2%	17.5%
Built-In	16.3	20.1	14.4	16.1	17.4	14.2	16.9	16.4
None	70.1	56.4	71.0	63.7	65.2	74.0	63.9	66.1
8. TELEVISION:								
Yes	98.3%	96.9%	98.2%	99.0%	94.3%	97.6%	96.6%	97.6%
No	1.7	3.1	1.8	1.0	5.7	2.4	3.4	2.4
a. Distribution of "Yes" Above:								
Color	38.3%	35.5%	46.4%	38.5%	42.1%	33.1%	29.8%	38.2%
Black & White	48.5%	52.7%	45.8%	48.5%	50.3%	58.1%	60.1%	50.7%
Both	13.2	11.8	7.8	13.0	7.6	8.8	10.1	11.1
9. REFRIG. TYPE AIR CONDITIONING:								
Yes	15.1%	3.5%	2.9%	9.7%	4.9%	4.7%	4.3%	7.8%
No	84.9	96.5	97.1	90.3	95.1	95.3	95.7	92.2
a. Distribution of "Yes" Above:								
Room units (1 or more)	82.6%	90.9%	87.5%	71.7%	76.5%	66.7%	83.3%	79.1%
Central systems	17.4	9.1	12.5	28.3	23.5	33.3	16.7	20.9
Electric	90.5	100.0	0	80.8	75.0	100.0	100.0	93.3
Natural Gas	9.5	0	100.0	19.2	25.0	0	0	6.7
10. WATER HEATED BY:								
Electricity	9.1%	27.6%	15.8%	15.0%	26.6%	55.1%	32.3%	21.1%
Natural Gas	89.2	65.3	83.1	81.8	63.4	40.2	65.1	75.4
Bottled Gas	1.1	4.9	.2	2.3	4.6	3.1	1.3	2.0
Other	.2	1.9	.2	.1	1.7	.8	1.3	.7
None	.4	.3	.7	.8	3.7	.8	0	.8
11. HOME HEATING BY:								
Electricity	.8%	3.7%	.7%	2.0%	2.6%	4.7%	3.1%	2.0%
Natural Gas	91.4	69.7	88.3	84.8	69.1	60.7	80.2	82.4
Bottled Gas	1.0	7.4	1.3	5.7	12.0	3.9	2.5	4.2
Other	6.8	19.2	9.7	7.5	16.3	30.7	14.2	11.4
12. OUTDOOR LIGHTING:								
Electric	17.5%	24.1%	11.1%	11.4%	19.7%	14.2%	15.6%	14.4%
Natural Gas	9.5	0	0	4.3	.3	0	.5	3.3
None	73.0	75.9	88.9	84.3	80.0	85.8	83.9	81.3

THE MONTANA POWER COMPANY
RESIDENTIAL APPLIANCE SATURATION SURVEY - JANUARY, 1971
MULTI-FAMILY BUILDINGS ONLY

	BILLINGS DIVISION	BOZEMAN DIVISION	BUTTE DIVISION	GREAT FALLS DIVISION	HELENA DIVISION	LEWISTOWN DIVISION	MISSOULA DIVISION	SYSTEM TOTAL
Number of Customers	4,790	2,635	3,115	5,240	2,395	395	2,990	21,560
Number Interviewed	157	78	84	166	81	12	89	667
2. RANGE:								
Electric	54.2%	82.1%	46.4%	68.1%	71.6%	100.0%	94.4%	68.2%
Natural Gas	42.0	17.9	52.4	31.3	25.9	0	5.6	30.3
Bottled Gas	.6	0	1.2	0	0	0	0	.3
Other	2.6	0	0	0	1.3	0	0	.7
None	.6	0	0	.6	1.2	0	0	.5
3. CLOTHES DRYER:								
Electric	31.9%	48.7%	22.6%	32.5%	38.3%	25.0%	47.2%	35.0%
Natural Gas	5.7	0	0	6.0	2.5	0	0	3.1
Bottled Gas	.6	0	0	0	0	0	0	.1
None	61.8	51.3	77.4	61.5	59.2	75.0	52.8	61.2
4. CLOTHES WASHER:								
Automatic	52.2%	68.0%	44.1%	49.4%	59.3%	41.7%	56.2%	53.5%
Wringer Type	6.4	5.1	19.0	7.8	4.9	8.3	5.6	7.9
None	41.4	26.9	36.9	42.8	35.8	50.0	38.2	38.6
5. REFRIGERATOR:								
Yes	100.0%	100.0%	100.0%	100.0%	98.7%	100.0%	98.9%	99.7%
No	0	0	0	0	1.3	0	1.1	.3
a. Distribution of "Yes" Above:								
Refrig. only	73.2%	67.9%	83.3%	66.3%	67.5%	100.0%	76.1%	72.3%
Refrig.-Freezer	26.8	32.1	16.7	33.7	32.5	0	23.9	27.7
6. SEPARATE FOOD FREEZER:								
Yes	30.6%	30.8%	11.9%	22.9%	19.8%	16.7%	29.2%	24.6%
No	69.4	69.2	88.1	77.1	80.2	83.3	70.8	75.4
a. Distribution of "Yes" Above:								
Auto. defrost	22.9%	8.3%	30.0%	21.1%	25.0%	0%	7.7%	18.3%
No Auto. defrost	77.1	91.7	70.0	78.9	75.0	100.0	92.3	81.7
7. ELECTRIC DISHWASHER:								
Portable	5.1%	5.1%	7.1%	6.6%	13.6%	8.3%	9.0%	7.3%
Built-in	5.1	9.0	3.6	9.0	12.3	0	11.2	7.9
None	89.8	85.9	89.3	84.4	74.1	91.7	79.8	84.8
8. TELEVISION:								
Yes	90.4%	97.4%	98.8%	99.4%	97.5%	100.0%	96.6%	96.4%
No	9.6	2.6	1.2	.6	2.5	0	3.4	3.6
a. Distribution of "Yes" Above:								
Color	32.4%	32.9%	26.5%	37.6%	46.8%	16.7%	33.7%	34.7%
Black & White	60.6	63.2	71.1	58.8	48.1	75.0	60.5	60.5
Both	7.0	3.9	2.4	3.6	5.1	8.3	5.8	4.8
9. REFRIG. TYPE AIR CONDITIONING:								
Yes	20.4%	2.6%	3.6%	9.0%	3.7%	0%	6.7%	9.1%
No	79.6	97.4	96.4	91.0	96.3	100.0	93.3	90.9
a. Distribution of "Yes" Above:								
Room units (1 or more)	71.0%	50.0%	100.0%	53.3%	66.7%	0%	83.3%	68.9%
Central systems	29.0	50.0	0	46.7	33.3	0	16.7	31.1
Electric	88.9	100.0	0	87.5	100.0	0	100.0	90.0
Natural Gas	11.1	0	0	12.5	0	0	0	10.0
10. WATER HEATED BY:								
Electricity	4.5%	2.6%	7.1%	3.0%	4.9%	16.7%	16.9%	6.1%
Natural Gas	94.3	96.2	90.5	95.8	90.1	83.3	82.0	92.1
Bottled Gas	.6	1.2	0	.6	3.7	0	0	.9
Other	0	0	0	.6	0	0	1.1	.3
None	.6	0	2.4	0	1.3	0	0	.6
11. HOME HEATING BY:								
Electricity	0%	0%	0%	0%	0%	0%	1.1%	1.1%
Natural Gas	97.5	98.7	98.8	97.6	93.8	91.7	94.5	96.9
Bottled Gas	.6	1.3	0	.6	4.9	0	2.2	1.3
Other	1.9	0	1.2	1.8	1.3	8.3	2.2	1.7
12. OUTDOOR LIGHTING:								
Electric	12.1%	11.5%	1.2%	5.4%	17.3%	0	12.4%	3.4%
Natural Gas	1.3	0	0	1.8	0	0	0	.8
None	86.6	88.5	98.8	92.8	82.7	100.0	87.6	95.8

THE MONTANA POWER COMPANY
RESIDENTIAL APPLIANCE SATURATION SURVEY - JANUARY, 1971

MOBILE HOMES ONLY

	BILLINGS DIVISION	BOZEMAN DIVISION	BUTTE DIVISION	GREAT FALLS DIVISION	HELENA DIVISION	LEWISTOWN DIVISION	MISSOULA DIVISION	SYSTEM TOTALS
Number of Customers	1,525	1,150	1,185	2,055	975	395	1,815	17,574
Number Interviewed	50	34	32	65	33	12	54	9,100
								280
								743
2. RANGE:								
Electric	8.0%	32.4%	46.9%	12.3%	21.2%	8.3%	27.8%	34.3 21.8%
Natural Gas	86.0	44.1	46.9	69.2	42.4	33.3	53.7	51.7 56.7
Bottled Gas	6.0	23.5	6.2	18.5	36.4	58.4	18.5	12.0 19.3
Other	0	0	0	0	0	0	0	0 0
None	0	0	0	0	0	0	0	0 0
3. CLOTHES DRYER:								
Electric	50.0%	52.9%	59.4%	37.0%	39.4%	41.7%	48.1%	43.2 46.4%
Natural Gas	4.0	0	0	3.0	3.0	0	3.8	3.2 2.5
Bottled Gas	2.0	0	0	0	3.0	0	0	1.7 0.7
None	44.0	47.1	40.6	60.0	54.6	58.3	48.1	32.7 50.4
4. CLOTHES WASHER:								
Automatic	86.0%	73.6%	71.9%	64.6%	66.7%	75.0%	66.7%	74.5 71.4%
Wringer Type	0	2.9	3.1	1.5	3.0	0	1.8	1.8 1.8
None	14.0	23.5	25.0	33.9	30.3	25.0	31.5	23.7 26.8
5. REFRIGERATOR:								
Yes	100.0%	100.0%	100.0%	98.5%	100.0%	100.0%	100.0%	99.9 99.0%
No	0	0	0	1.5	0	0	0	0 0.4
a. Distribution of "Yes" Above:								
Refrig. only	54.0%	64.7%	46.9%	60.9%	66.7%	75.0%	68.5%	61.3 61.3%
Refrig.-Freezer	46.0	35.3	53.1	39.1	33.3	25.0	31.5	38.7 38.7
SEPARATE FOOD FREEZER:								
Yes	32.0%	41.2%	15.6%	24.6%	48.5%	41.7%	29.6%	31.4 31.4%
No	68.0	58.8	84.4	75.4	51.5	58.3	70.4	68.6 68.6
a. Distribution of "Yes" Above:								
Auto. defrost	0%	50.0%	20.0%	6.3%	6.3%	0%	12.5%	13.6 13.6%
No Auto. defrost	100.0	50.0	80.0	93.7	93.7	100.0	87.5	86.4 86.4
ELECTRIC DISHWASHER:								
Portable	4.0%	5.9%	3.1%	6.2%	3.0%	8.3%	13.0%	6.4 6.4%
Built-in	4.0	5.9	0	0	3.0	0	0	1.8 1.8
None	92.0	88.2	96.9	93.8	94.0	91.7	87.0	91.8 91.8
8. TELEVISION:								
Yes	100.0%	85.3%	100.0%	100.0%	97.0%	91.7%	92.6%	96.1 96.1%
No	0	14.7	0	0	3.0	8.3	7.4	3.9 3.9
a. Distribution of "Yes" Above:								
Color	42.0%	37.9%	62.5%	53.8%	46.9%	63.6%	24.0%	45.7 45.7%
Black & White	50.0	58.7	37.5	46.2	50.0	36.4	70.0	51.7 51.7
Both	8.0	3.4	0	0	3.1	0	2.0	2.6 2.6
9. REFRIG. TYPE AIR CONDITIONING:								
Yes	22.0%	29.4%	15.6%	21.5%	6.1%	8.3%	13.0%	17.9 17.9%
No	78.0	70.6	84.4	78.5	93.9	91.7	87.0	82.1 82.1
a. Distribution of "Yes" Above:								
Room units (1 or more)	63.6%	70.0%	100.0%	92.9%	50.0%	0%	71.4%	76.0 76.0%
Central systems	36.4	30.0	0	7.1	50.0	100.0	28.6	24.0 24.0
Electric	75.0	100.0	0	100.0	100.0	100.0	100.0	91.7 91.7
Natural Gas	25.0	0	0	0	0	0	0	8.3 8.3
10. WATER HEATED BY:								
Electricity	10.0%	14.7%	31.3%	30.8%	33.3%	41.7%	41.3%	28.2 28.2%
Natural Gas	84.0	55.9	65.6	55.4	51.5	41.7	41.3	60.0 60.0
Bottled Gas	6.0	29.4	3.1	13.8	15.2	16.6	1.8	11.1 11.1
Other	0	0	0	0	0	0	0	0 0
None	0	0	0	0	0	0	0	0 0
11. HOME HEATING BY:								
Electricity	0%	2.9%	9.4%	0%	0%	0%	0%	1.6 1.6%
Natural Gas	92.0	64.8	75.0	78.5	54.6	33.3	66.7	71.4 71.4%
Bottled Gas	8.0	29.4	6.2	21.5	33.3	25.0	5.5	16.8 16.8
Other	0	2.9	9.4	0	12.1	41.7	27.8	10.0 10.0
12. OUTDOOR LIGHTING:								
Electric	32.0%	17.6%	12.5%	7.7%	18.2%	0	11.1%	14.4 14.4%
Natural Gas	2.0	0	0	1.5	0	0	1.9	1.1 1.1
None	66.0	82.4	87.5	90.8	81.8	100.0	87.0	84.5 84.5

APPLIANCE SATURATION SURVEY - FEBRUARY, 1968

This survey represents a sampling of approximately 3% of all accounts in our electric residential classification. The selection of accounts to be surveyed was determined arithmetically -- each 33rd customer in each route in each bookkeeping office throughout our electric system. The interview was conducted by telephone in most cases. In the event a customer could not be reached by phone, a personal call was made or the next customer in that route was substituted for interviewing.

Results are shown as totals for each of the seven divisions and the system and for principal or significant communities within each division. The reliability of the saturation figures are in direct ratio to the number of customers interviewed for each community or division.

Additional Notes:

1. This survey includes all types of customers in the residential classification and for our entire electric system, while the survey taken in 1965 included only selected towns and did not include mobile homes.

2. The '65 survey indicated nearly 100% saturation for refrigerators. Therefore, the '68 survey was designed to show not only the fuel used for refrigeration but also the type of equipment:

- a. Refrigerator - straight refrigerator with freezing capacity limited to small ice cube maker.
- b. Refrigerator-Freezer -- Has a refrigerator compartment with a food storage freezing compartment all in one box. Figures for No Frost Sections are a breakdown from those who answered "yes" to "Do you have a Refrigerator-Freezer?"

- c. Freezer -- a completely separate box for storage of frozen foods only.
3. The Other classification under Range, Clothes Dryer and Refrigerator represents propane installations but also includes wood or coal equipment under Ranges.

February, 1968

Ref. Type Air Conditioning
Room Unit
Central System
None
Number Interviewed
Of Central Systems:
Electric
Natural Gas

RESIDENTIAL APPLIANCE SATURATION SURVEY

Made - April, 1965

	27.5 BILLINGS DIVISION	12.0 BOZEMAN DIVISION	24.0 BUTTE DIVISION	35.0 GREAT FALLS DIVISION	12.0 HELENA DIVISION	15.0 LEWISTOWN DIVISION	10.0 MISSOULA DIVISION	13.5 SYSTEM TOTALS
	No.	No.	No.	No.	No.	No.	No.	No.
	\$	\$	\$	\$	\$	\$	\$	\$
Range								
Electric	548	250	436	759	299	148	460	2,900
Gas	256	119	267	290	72	15	105	1,124
None	3	2	5	11	0	4	6	31
Number Interviewed	807	371	708	1,060	371	167	571	4,055
Clothes Dryer								
Electric	358	173	311	537	183	77	288	1,927
Gas	54	7	4	72	4	4	6	190
None	393	190	393	450	184	86	286	1,943
Number Interviewed	805	370	708	1,059	371	167	580	4,060
Clothes Washer								
Automatic	581	279	506	779	274	98	366	2,883
Conventional	143	66	155	205	37	47	112	765
None	86	30	69	82	60	22	93	442
Number Interviewed	810	375	730	1,066	371	167	571	4,090
Refrigerator								
Frostless	168	95	200	312	134	32	146	1,087
Conventional	657	278	522	742	238	136	424	2,997
None	6	1	1	4	0	1	3	16
Number Interviewed	831	374	723	1,056	372	169	573	4,100
Separate Food Freezer								
Frostless	14	7	16	30	24	4	27	122
Conventional	449	213	246	480	145	87	255	1,875
None	341	163	462	552	202	77	222	2,056
Number Interviewed	804	383	724	1,062	371	168	581	4,093
Dishwasher								
Built-In	80	37	41	96	39	11	49	353
Portable	58	38	87	89	40	22	44	378
None	666	295	606	878	292	134	477	3,348
Number Interviewed	804	370	734	1,063	371	167	570	4,079
Television								
Black & White (1)	705	313	602	842	337	135	469	3,403
Black & White (2-3)	41	26	105	198	18	12	43	443
Color	56	11	7	41	15	7	23	160
None	21	24	15	37	7	15	41	160
Number Interviewed	823	374	729	1,118	377	169	576	4,166
Ref. Type Air Conditioning								
Room Unit (1 or more)	128	7	5	67	8	1	8	224
Central	10	3	1	7	5	2	8	36
None	699	261	718	985	352	162	563	3,847
Number Interviewed	837	371	724	1,059	372	165	579	4,107

